

Recent Developments in the UK Retail Prices Index: Quality Management

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Abstract: The Retail Prices Index (RPI) is a key macro-economic indicator which forms the basis of published UK headline inflation statistics. The RPI is based on a complex monthly multi-stage survey of price movements of goods and services which UK consumers typically buy. The UK Office for National Statistics (ONS) is re-engineering the index production processes, with the objectives of improving RPI quality and delivering better value for money. This paper describes UK experience and provides an up-to-date report on recent initiatives taken to strengthen data quality through the application of formal quality management techniques.

1. Introduction

About two years ago, the then UK Central Statistical Office (CSO), now part of the Office for National Statistics² (ONS), embarked on a number of developments to improve the quality of the Retail Prices Index (RPI) production processes. This paper describes the UK experience and plans for the development of a quality management system based on viewing the data assembly and the construction of the index as a production process.

Work completed so far includes a re-design of the sampling arrangements, contracting out of local data collection, introduction of hand-held computers with validation at the point of data collection, a re-development of the computer processing system, a comprehensive review of the arrangements for data collected centrally from large retail and service organisations, an initial assessment of RPI sampling errors, optimisation of the local price collection culminating in the development of a formal quality management programme for the RPI. These initiatives are all designed to improve the quality of the RPI through better control of the processes from the collection of data through to the publication of the RPI.

2. The UK retail prices index

The RPI is the main measure of consumer price inflation in the UK and the basis of headline inflation figures. The index is based on a complex multi-stage sample survey of prices of consumer goods and services, with monthly collection of some 120,000 price quotations. Of these, some 110,000 are obtained locally from outlets in 146 geographical locations across all regions of the UK. The remaining 10,000 or so prices are collected centrally. The prices cover a fixed "basket" of around 650 items designed to be representative of goods and services bought by most UK households.

The local price collection is carried out in some 18,000 outlets, mainly by field workers recording prices actually charged. Some telephone interviewing is used for the prices of some services like plumbers,

¹ This paper is updated and reedited by David Fenwick and Rachael Beaven and based on an earlier version written by Marta Haworth.

² The ONS came into being on 1 April 1996 and for simplicity this paper refers to the UK statistical office as ONS throughout.

decorators and electricians. The centrally collected data rely on pricing information supplied to the ONS by the larger retail and service organisations. In recent years, the reliance on the central collections has been steadily increasing and they now have a weight of more than 50% of the index.

The RPI is an annually chain-linked Laspeyres-type index. The lowest level indices are constructed for the 650 or so representative "basket" items broken down by region and shop type (multiple or independent). The weights for these lowest level micro-indices are derived from the Family Expenditure Survey (FES) and from retailing survey data. Several sources, including market research data, are used to construct the item weights. At each January link point there is an annual review of the selection of the "basket" of representative items and the weights are also updated. (Further details of RPI construction are given in Annex A).

3. Development of a quality management programme

The main objective of developing a quality management programme for the RPI is to strengthen index quality through improved quality control at all stages of collection and analysis whilst providing better value for money. This is a major development programme spanning a five year period and introducing fundamental changes into an index production system which has been very stable over the last 40 years or so.

In the first phase of the programme, the emphasis was on introducing probability sampling techniques into the local price collection, on improved validation through the use of computer - assisted data capture (CADC) and on bringing greater control and efficiency into the local data collection process. This was brought into effect when the local price collection was contracted out to Research International Ltd in January 1995.

The second phase, which started in mid 1995, focussed on the central data collections. This involved developing improved relationships with data suppliers, enhancing data capture and validation for the centrally collected data and strengthening ONS control over these increasingly important, but traditionally fragmented processes. Throughout, the emphasis is on minimising operational costs and on strengthening data quality. This process will be completed by summer 1997 when a new user friendly client server will be fully introduced to replace the 150 spreadsheets currently being used.

The third phase which was started in the first half of 1995 will lead to the implementation of a formal quality management programme for the index and the associated survey operations. Two key initiatives in this third phase have been the setting up of pilot quality management projects and a sample optimisation project to improve accuracy, whilst reducing data collection costs. This is underpinned by a detailed assessment of sampling errors using alternative methodological approaches and cross-validation of their results. The objective of the third phase is to institute a process of continuous measurable improvement in survey operations and index production, backed by much stronger links with data suppliers and users and by a systematic quantitative analysis involving the assessment of both sampling and non-sampling errors.

The following specific developments are discussed in this paper:

Phase 1 Local Prices Collection

- i. the re-design of sampling and index production arrangements for locally collected prices;
- ii. the introduction of Computer Assisted Data Capture (CADC) and validation at the point of data collection;
- iii. the contracting out of local price collection and the introduction of auditing procedures;

Phase 2 Central Prices Collection

- iv. the re-engineering of central price collections and related index production processes;

Phase 3 Formal Quality Management Programme

- v. the development of a formal quality management programme.

4. Phase 1: Local prices collection

i. Introducing probability sampling

The System in use before 1995

The selection of outlets in which price changes have been observed was purposive and kept fixed over very many years. The shopping centres where price collection took place increasingly represented administrative convenience rather than statistical considerations and this clearly conflicted with the objective that the outlet panel should be representative of consumer spending. Concerns over the representativeness of the RPI sample led to the decision to review the sample [1]. Price collection was carried out on paper forms which grouped together a set of commodities which could typically be found in a single outlet.

Revision of the RPI Sample

In 1995 the ONS instituted a five-year phased programme of sample renewal, progressively replacing purposive sampling by a statistical probability sampling approach. There is a paramount need to deliver data to a very tight timetable and to a high standard of reliability. Also continuity of RPI price collection and a statistical series which is free from discontinuities is vital for the accurate measurement of price changes. This has meant that the challenges presented by the revision of the RPI sample have been considerable.

The new RPI sampling arrangements involve three dimensions:

- i. the sampling of geographical locations which have clusters of shopping facilities and other outlets providing consumer services;
- ii. the sampling of outlets in those locations;
- iii. the sampling of “basket” items and of specific products and brands to be priced in the sampled outlets.

New Sample Design: Locations

As a location sampling frame, the ONS uses a commercially available list of shopping centre catchments derived from a geographical analysis of branches of multiple retailers. The catchment areas are contiguous clusters of postal sectors, broadly representing central shopping areas and the areas where the local shopping population live. The centres are of three types: major, district and local. For each centre, an estimate of its total shopping population is available from the commercial database.

The chosen sample design is a stratified random sample, with stratification by region and location size. The numbers of sampled locations are allocated to regions in proportion to expenditure of index households as estimated from the UK Family Expenditure Survey. Within regions there are no detailed estimates of expenditure, so total shopping population is used for assigning numbers of sampled locations to shopping centres size strata. All the large centres with shopping populations over 500,000 are selected, while numbers of sampled locations in the remaining strata are allocated in proportion to total shopping population.

New RPI Outlet Sample: Enumeration

The next stage is to randomly select outlets. It is not possible to use a business register because the latter contains many out-of-scope shop-type units (e.g. accountancy firms and sign writing firms both of which sell their services to businesses rather than individuals) and also out-of-date information. In the sampled locations field enumeration is carried out to produce a list of all outlets in the area specified, together with their addresses, postcodes and the type of shop (multiple or independent). As the turnover of each outlet is not readily available for use as a size measure, estimated net retail floor space is used as a proxy. Where necessary, for example for outlets such as department stores, the floor space devoted to each commodity group is used. The enumerators also indicate which commodity groups can be priced in each outlet. This is done according to a specially designed shop classification list (Annex B).

New RPI Outlet Sample: Implementation

The outlet coding scheme drives the link between outlets and items. This link is handled via the master list of shop classification codes each of which is associated with a list of items priced in such shops. Using this approach, outlets are classified by commodity group and, where appropriate, shop type. Any given outlet may be in more than one "stratum" if it sells items from more than one commodity group. Each "stratum" has its own sampling frame which consists of all the outlets selling that commodity group. Outlets are selected independently within each "stratum".

For each commodity group, the required number of outlets, plus some reserves to allow for sample attrition, are drawn from the given sampling frame by either:

- a. simple random sampling (SRS), or
- b. sampling with probability proportional to size (PPS).

Commodity Group	Shops to select	Shop Code	Shop Type	No	Selection Type
Meat	Butcher	1101	M or I	1	SRS
	1 Fresh Beef and Lamb	Supermarket	1202	M or I	1
	Dept Store type 1	4101			
	Dept Store type 3	4103			
	Dept Store type 5	4105			

PPS sampling is used for commodity groups where there is a large range of sizes of shops. For example for DIY goods there may be a small hardware shop and a large out-of-town outlet in the sampling frame so by using PPS sampling the larger store will have a higher chance of selection. For butchers the outlets are selected using a simple random sample because the range of sizes of butchers shops is small. An example for fresh beef and lamb is shown below. Firstly a butcher should be selected using a simple random sample from all multiple and independent butchers. Secondly a supermarket or department store which sells food is selected using probability proportional to size. Fresh beef and lamb prices will be collected once within each of the two selected outlets.

ii. Computer-assisted data capture (CADC)

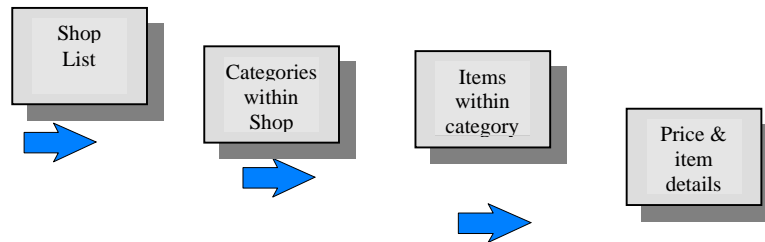
The strategic objective of improving the quality of the index also led to a decision to move to computer assisted data capture. Hand-held computers for local price collection were introduced as part of the new contractual arrangements in 1995. Several important advantages have resulted from the adoption of this technology:

A significant reduction in the time taken to make the complete data set available for processing in computer-readable form;

- i. Improved data quality by providing additional and more effective data checking facilities at the point of price collection;
- ii. Improved control of the collection process through the use of automatic time and date stamps on each data entry, which makes it easy to detect data which was not collected during shop opening hours;
- iii. More flexibility to introduce further quality improvements, for example, in item descriptions;
- iv. Increased analytical and research capability, leading to improved methods. For instance by introducing standardised description fields it is possible to make quality adjustments to the data when new products are introduced.

The introduction of this technology followed a feasibility assessment undertaken by the ONS in early 1994. Hand-held computers were introduced for live collection in January 1995, after a four-month transitional period.

Hierarchial Psion Menu Structure



The Psion 3A hand-held personal computer was used for this application. The software specifically developed for the RPI price collection uses a series of hierarchical menus which allow the collector to select the outlet, item group and then specific item to be priced. The Psion software also includes routines for transmitting the completed data set via modem to the contractor's Head Office.

The software incorporates a routine to validate prices at the point of entry by reference to the previous month's price for that particular quotation (limit on percentage price change), and to all prices for that item (upper and lower limits for that price).

In parallel with the transition to CADC from a wholly paper-based system the ONS implemented a new processing system for the central collation of locally collected price data. A SIR database management system was replaced by a new INGRES database. A strong practical reason for the simultaneous development of the new system was the need to implement a suitable interface in time for CADC introduction. The new INGRES database has an audit trail so that it is possible to follow changes made to each price quotation. Each change is recorded with the previous price, the name of the person making the change and the date and time of the change.

A new interface has also just been completed to transfer data between the INGRES system and SAS to allow a full range of statistical analysis to be carried out on the data.

iii. Contracting out and the local price collection auditing procedure

These developments were implemented as part of contracting out of the entire local data collection. The process involved a competitive tendering operation in which a UK market research company Research International Ltd won the 5-year contract for local data collection. This involved a complete changeover of the field force; new contractual arrangements had to be put in place in order to ensure adequate controls for ONS as well as for data collection.

To ensure satisfactory back-up arrangements in the event of a disaster such as contractor failure, a fully tested disaster recovery plan had to be developed. This plan is now in place and is supported by 10 part-time locally based co-ordinators employed by the ONS principally for auditing the local price collection. These arrangements have represented a new venture (there was no regional data collection force employed by the former CSO).

There are two main components of the auditing procedure: an accompanied check of field collection and a random post-hoc check both of which are carried out by an ONS auditor. The arrangements have proved to be very successful. In particular they have highlighted problems with individual collectors, with a particular region or with a particular collection task. Each of these is followed up with appropriate action for instance new guidance notes are issued if there is a general collection difficulty. Problems with individual collectors are followed up with the area supervisor and RI Head Office. The random post-hoc check is discussed in more detail below.

Quality control of local price collection

This involves selecting each month a sample of locations and index items for which the prices are to be audited. The principal aim is to see if the rate of error is acceptable; an acceptable error probability is defined as 5% or less.

The audit is carried out within two working days of the main price collection. ONS auditors are given a list of 70 uniquely defined and randomly selected price quotations. Items which were out of stock at the time of collection are not checked. Therefore, the total number of price quotes audited in each location will be less than or equal to 70 depending on how many of these items were out of stock. Associated with each possible total is a threshold that defines the number of price errors which would lead to a location failing the test and for the inference to be made that the underlying error rate is unacceptable. Price errors refer only to price quotes which were incorrectly recorded at the time of collection; price quotes which are incorrect at the time of the audit, but which the auditor is able to identify as having been correct at the time of price collection, are accepted.

The quality of item descriptions and the use of indicator codes (e.g. to indicate that an item is on sale) are also assessed, as these are important to sustain the comparability of price collection across months and to better inform the validation process. For example a description “large blue bottle of shampoo” is not adequate as this does not properly describe the product. The brand name and the exact size should always be recorded. The subjective nature of this assessment means that there is no formal test to pass or fail a location on this basis but action is taken to ensure the quality of descriptions is improved.

This auditing approach has proved to be a very valuable tool for quality management of the price collection. Feedback on the quality of descriptions and use of indicator codes leads to important improvements in field force training and to enhancements to some of the systems supporting the field operations. For example, item descriptions are being improved in particular commodity groups to ensure that the correct goods are being priced and that when replacement products are selected they are of the same quality as the previous product. For example, for alcoholic off sales brand, type, size, proof and other details are all recorded.

5. Phase 2: Central prices collection

iv. Re-engineering of central collections processes

The processing of the centrally collected price data for the index has remained virtually unchanged during the phase devoted to the re-engineering of the local prices system. This was a deliberate decision, however it has proved increasingly problematic - with the processing largely being carried out on a fragmented set of 150 spreadsheets. These have been developed over time as pressures for reductions in the cost of data collection have moved additional parts of the index towards the central collection system which was seen as a more efficient data collection method than the local price collection. However, there has been increasing concern over the risk of errors arising from a fragmented set of processing operations with many variations in their design and only limited central control.

A user-friendly client-server has now been written to replace the spreadsheets. It has been tested and will be phased in gradually until by the middle of 1997 it will completely replace the spreadsheets. This will provide data validation at the point of entry. It will also provide much better security via a system of log in codes. There will also be better control because the possibility is introduced of seeing a record of all the changes made and a list of who made them.

Screen 1 and 2 below show examples of the screens which can be seen in the new client-server environment. Screen 1 shows the data processing and analysis options available to the user and screen 2 shows a list of collection items.

In addition to strengthening control over the processing of these data sets, improved timeliness and accuracy of data inputs is also a priority. The ONS set up discussions with data suppliers to consider how the data collection process could become less burdensome and error-prone. This indicated that electronic mail or transfer on diskette from companies' own computer records to the ONS would represent a more cost-effective solution for this application than full Electronic Data Interchange (EDI). In part this was because the information collected is restricted to price and so is a relatively small data set. Companies are now asked for their preferred mode of data transfer. The receipt of electronic data has reduced the need to re-input the data and therefore should reduce the possibility of keying in errors. This has also been well received by companies who prefer to send the data electronically as it means less processing time for them.

Screen 1

Message Maintenance Reports Forms

ini3:rpi14 10-mar-1997

Processing Period : 199701

Runtype: live Year: 1997 Month: 1

Maintain Item Processing Central Shop Processing Audit

Exit Utilities

Screen 2

itegf1:rpi14 Processing Period : 199701

Item Id	Item Desc	Start Date	End Date	Calc Type	
210201	FLOUR, SELF RAISING	198702	999999	1	↑
210202	RICE LONG GRAIN WHITE	198702	999999	1	
210204	DRY SPAGHETTI	198702	999999	1	
210205	MUESLI	198702	999999	1	
210209	BREAKFAST CEREAL	199602	999999	1	
210301	CREAM CRACKERS	198702	999999	1	
210302	DIGESTIVE BISCUITS	198702	999999	1	
210304	BISCUIT CHOCOLATE COATED	198702	999999	1	↓

1 2 3 4 5 6

Computer Produced
 Calculated Centrally
 Central System Calc

OK ID Order End

6. Phase 3: Quality management programme

v. Development of a quality management programme

The working definition of quality management adopted for the RPI is *"a process of continuous improvement, systematically evaluated against customer requirements"*. The aim is to develop an operational system focused on user requirements and underpinned by systematic and objective quality measurement.

This quality management approach represents a continuing process, not a one-off initiative, and one where quality assurance reduces the need for checking. The improvement process has to be owned by everyone working in the organisation and has to encompass not only the ultimate quality of the index as a product but also the related processes, including the associated statistical services and overall costs.

Throughout, the aim is to place responsibility for ensuring quality in the hands of those closest to the relevant information. For local price collection this means the collectors will take responsibility for ensuring the quality of their work. For central collections this means the head office staff who input the data are also responsible for ensuring the quality of the data. Operational work is based upon consistent internal procedures and effective and efficient communication with users and suppliers. Quality is measured against clear standards which are quantified where possible and which are regularly referenced to customer needs. The measures currently used are:

- % of maximum quotes collected
- % of quotes in each validation code after initial scrutiny run
- rate of pricing wrong products
- rate of failure of product descriptions.

There are also a number of other measures which are currently being developed. These include:

- count of incidents of data format error by type
- % of queries raised each month
- % of prices with uncleared queries at closedown
- % of queries not answered satisfactorily
- count of data edits reversed later in the cycle
- how many times the index calculation was run, with how many items were recalculated each time.

Each month a report will be produced using these quality measures. This report will be discussed at the monthly quality day when the previous month's work is discussed.

The framework for the quality management system currently under development is set out in Annex C. This follows the "Quality Management Plus" approach developed by Kaufman [5]. Following assessment of the gap between user needs and the quality standard actually attained, change and continuation requirements are identified, and an assessment is carried out of the implications for suppliers, staff (their roles and responsibilities, training needs and work programmes and schedules), systems (production processes, control systems and product design) as well as resources. The next step is to develop possible strategies and then assess change implications, and select and implement an action plan.

The needs assessment is planned at two levels - internal and external. Annual frequency is planned for the external assessment; internal assessments relating to particular aspects may be carried out six-monthly and in some cases quarterly or monthly. In particular, quality reviews have been established as part of the RPI monthly processing cycle.

In this system, the key attributes of quality are:

- Accuracy:** How accurate are the products and services?
- Relevance:** To what extent does the statistical design differ from the ideal concept? How relevant are the products and services to user needs?
- Timeliness:** How successful is the statistical agency in meeting pre-determined standards (official release dates and service response standard)?
- Efficiency:** Delivery of value for money products and services (accuracy, relevance and timeliness at minimum cost).

Quantitative measurement will include indicators relating to all the above attributes. Quantitative error measurement will be developed for accuracy and relevance (the latter is user-specific). The total RPI error is regarded as including both sampling and non-sampling error (Annex D). Work is continuing on developing an appropriate methodology for assessing the sampling error of the RPI. A project is currently in progress to develop a simulator for the RPI data. The simulator will simulate data for the whole population of locations and outlets. A large number of random samples could then be drawn from the simulated data in the same way that locations and outlets are actually drawn for the RPI. The sampling error would then be computed for each of the samples using: linearization, bootstrap and jackknife. Calculations will be carried out for each of the different methods for a large number of simulated sample data sets and the results compared. This should give an indication of which method is the most appropriate for the RPI and it should also give an indication of how robust any estimates will be.

Efficiency is an important part of the quality management programme. A project was carried out in 1995 to improve the cost-effectiveness of the RPI local sampling arrangements. Initial ONS analyses suggested that the type of commodity is a more important determinant of price change than geographical location. The project resulted in a 20% reduction in the number of locations but an increase in data collection for those commodities which showed greatest variability of price change. These changes were implemented in 1996.

A number of specific processes have provided particularly valuable inputs to the quality management programme. So far these include:

- i. Process mapping which has proved to be a very valuable tool for gaining staff involvement and commitment at all levels. This technique has proved to be a particularly useful tool for generating new insights into existing processes and ideas for streamlining and rationalisation;
- ii. Quality reviews are now an established part of the RPI monthly processing cycle. One key element in these is a monthly quality day which provides an opportunity for all staff involved to think about ways of improving the quality of their work. Another is the monthly meeting by operational managers to review all quality measures, both relating to the performance of the contractor for local price collection and to the internal processes operated by RPI staff. Not only products but also services can be successfully covered.

- iii. As part of preparations for the application ISO 9000 registration, planned during 1997, improved documentation of all processes is now well on the way to completion. The key feature of the ISO 9000 requirements is the establishment of a schedule of internal audits of all aspects of RPI processing. This is an important extra discipline and will help to ensure that the way in which work is actually carried out always adheres to what is stated in the documentation. These two developments will strengthen the standards of work throughout the RPI operation. We intend to share our experience of going through the ISO 9000 process when this has been completed.

7. Conclusion

The UK experience suggests that the development of a quality management programme for the production of a highly sensitive and complex statistic such as the RPI is an ambitious undertaking. The results obtained in the areas of sampling, computer-assisted data capture and audit demonstrate that these lead to significant improvements in the statistical agency's control over these vital macro-economic statistics. Further work is needed towards achieving the goal of a fully effective quality management system.

ONS future plans include:

- i. development of a stronger customer focus, for the RPI and related statistical services, with the objective of regular quantitative assessments of user satisfaction. A RPI user group will be set up for this purpose.
- ii. construction of quantitative indicators of quality. This will in addition to accuracy assessment cover also timeliness, relevance (user satisfaction and divergence from conceptual "ideal") and efficiency (measurements relating to both ONS operations and to local prices contract performance).
- iii. development of a cost-benefit model to underpin the RPI quality improvement programme.

8. Acknowledgements

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ANNEX A. Background information on the RPI

Structure of the RPI

The all-items index is built up in several stages, with indices obtained at each more detailed stage subsequently weighted together to give higher level indices. If P is the relevant price quotation, t is the current period, w is the weight reference period (normally the 12 months to June in the preceding year) and p is the price reference period (January each year), the index can be expressed as $\frac{\sum P_t q_w}{\sum P_p q_w}$.

In the RPI the goods and services which households buy are grouped into sections (bread, milk, etc) and within sections into items (sliced white loaf, wholemeal loaf ...). Sampling the price of an item is stratified by region and shop type (multiple stores and independents).

Each section in the index is assigned a weight calculated from Family Expenditure Survey (FES) data. The weights are calculated by taking FES expenditure data for the weight reference period (12 months ending in the June before the January price reference period) and uprating them by the increase in the appropriate sub-index between the weight reference period and the price reference period.

Item weights are derived from a numbers of sources, including the FES, the National Food Survey and market research data. Regional weights are assigned according to the expenditure patterns observed from FES data; outlet weights come from the Retailing Enquiry.

At the most basic level of the index (micro-indices), within a given region and shop type, price changes are averaged without weighting over shops and locations. In each case one of the two alternative formulae given below is used to calculate the price change from the price reference period to time t :

$$\text{ratio of averages (R-A)} \quad R_{0t} = \frac{\overline{P_t}}{\overline{P_0}}$$

$$\text{average of relatives (A-R)} \quad R_{0t} = \frac{1}{n} \sum_{i=1}^n \frac{P_{it}}{P_{i0}}$$

The ratio of averages is used wherever possible (particularly for homogeneous items). But where there is a wide range of base prices within items - for instance furniture or large consumer appliances - the average of relative price changes is used, to prevent a few higher priced indicators from dominating the index. However, the average of relatives has some undesirable properties in a chain index. For example if a price change is exactly reversed in a subsequent period, the index does not return to the level it was at before the increase.

The index is a sample estimate derived by sampling over time, and among outlets and commodities. If the fixed basket index formula is approximated by a Laspeyres formula, and assuming that the item is stratified by region r and outlet type o , the index of price change in item i from the price reference period 0 to time t is given by:

$$I_{0t}^i = \sum_{r,o} w_{iro} R_{0t}^{iro}$$

where w_{iro} is the weight given to item i within region r and outlet type o . The index for section s is:

$$I_{0t}^s = \sum_{i \in s} W_i^s I_{0t}^i$$

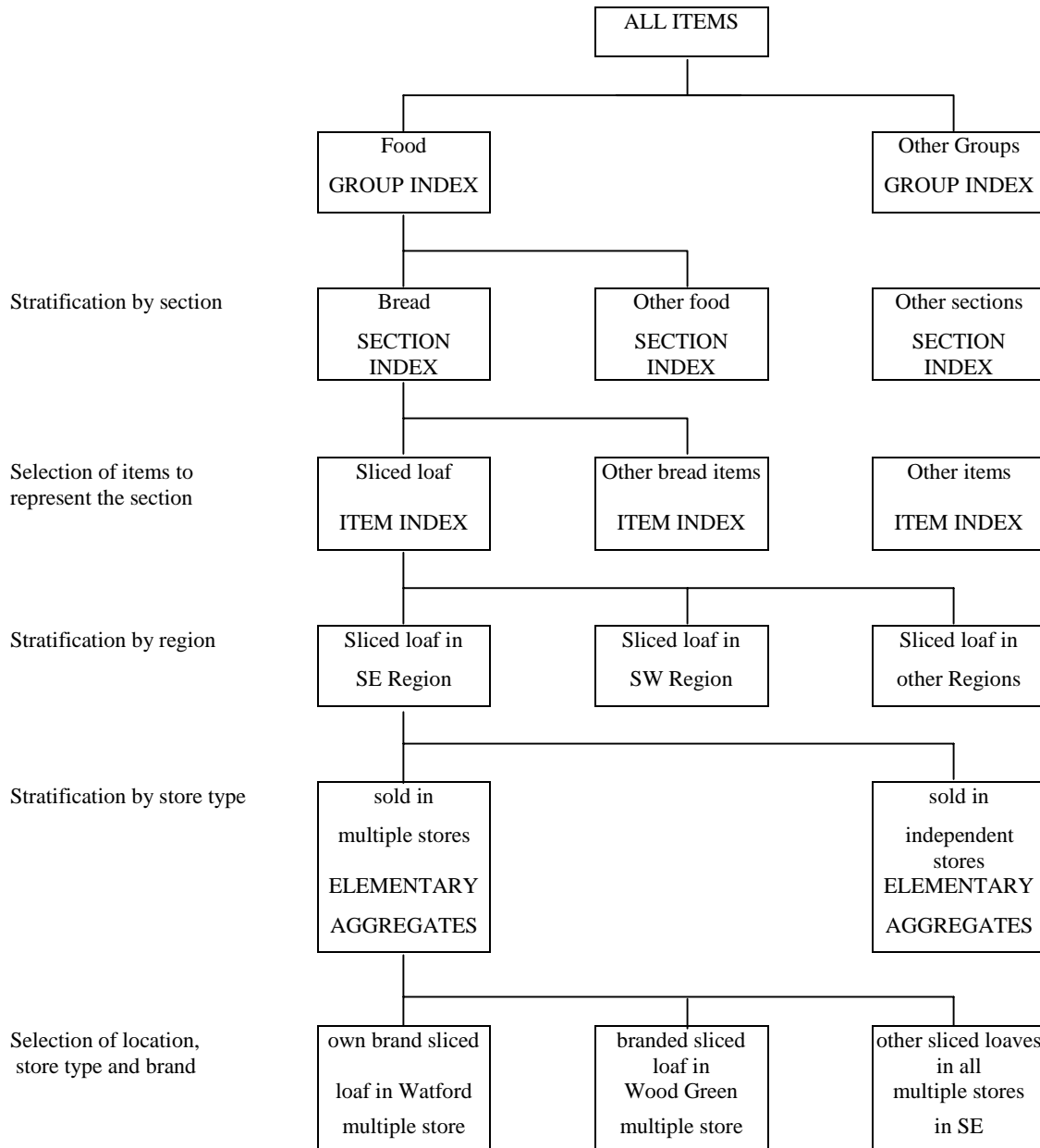
where W_i^s is the weight given to item i within section s , and the overall index is:

$$I_{ot} = \sum_s W_s I_{ot}^s$$

where W_s is the weight given to section s .

There are several ways in which the detailed structure of the index departs from the outline given above, which have implications for the estimation of sampling error. The region by shop type stratification does not apply to all items: some are stratified by region only, others by shop type only and others are not stratified at all. The general structure of the index is shown in Table 1.

Table 1. Diagram of RPI Structure



The sampling arrangements

The RPI is based on a multi-stage sample which can be considered as a two way array of region stratum and section stratum, as shown in Table 2.

Within a region locations are selected and within a location outlets are selected. Within each section of the index several items are selected and a description specified. At each outlet a variety or brand of that item is selected for pricing. Thus there are four levels at which sampling takes place:

- the selection of locations
- the selection of outlets within each location
- the selection of items
- the selection of products to represent an item.

Table 2: Sampling Structure of the RPI

REGION STRATUM		REGION: East Anglia					OTHER REGIONS ...		
Clusters of outlets within each location		Cambridge	Norwich	Kings Lynn	Peterborough	Woodbridge	Other Locations.....		
Section	Items								
	Large Loaf, sliced								
BREAD	Large Loaf, unsliced								
	Small White Loaf								
	6 bread rolls, white								
SECTION STRATUM	Small Brown Loaf, sliced								
Section	Items								
	Flour								
CEREALS	Rice								
	Dry Spaghetti								
	Muesli								
	Cornflakes								
	Weetabix, or own brand								
Other Sections ...	Other Items ...								

ANNEX B. List of shop classification codes for outlet sampling

CODE	SHOP/SERVICE DESCRIPTION	CODE	SHOP/SERVICE DESCRIPTION
1000	FOOD	4225	Nursery Goods
1100	Food Specialist	4231	Tobacconist
1101	Butcher	4232	Confectionery, Tobac. And Newsagents (CTNs)
1102	Fishmonger	4233	Stationer
1103	Baker	4234	Card Shop
1104	Greengrocer	4235	Newsagents
1105	Confectionery	4241	Pet Shop
		4251	Garden Centre
		4261	Motor Accessories Shop
1200	Food Store	4300	Leisure Goods
1201	Convenience Store	4301	Toy Shop
1202	Supermarket (licensed, without petrol station)	4302	Bicycle Shop
1203	Supermark (unlicensed)	4303	Sport Shop
1204	ASDA	4304	Camping Shop
1205	Safeway		
1206	Gateway	5000	SERVICES
1207	Supermarket (licensed, with petrol station)	5100	Leisure Services
1300	ALCOHOL	5111	Cinema
1310	Alcohol Off Licensed	5112	Theatres
1311	Off-license	5113	Bingo Hall
1312	Pub with Off-sales	5114	Dance Hall/Disco/Night Club
1320	Alcohol On Licensed Premises	5121	Squash Courts
1321	Pub or Wine Bar (with food)	5122	Leisure centre
1322	Pub or Wine Bar (without food)	5123	Swimming Pool
1400	Catering	5200	High-street Services
1411	Restaurant (licensed)	5211	Launderette (self-service)
1412	Restaurant (unlicensed)	5212	Dry Cleaner
1421	Take-away Fish & Chips	5221	Hairdresser Unisex
1422	Take-away Ethnic Food	5222	Barber
1423	Burger Bar	5223	Women Hairstylist
1424	Sandwich Bar	5231	Optician
1431	Canteen	5241	Video Rental
		5251	Shoe repairs
2000	CLOTHING AND FOOTWEAR	5300	Other Services
2100	Clothing	5301	Funeral Services
2111	Men's clothing	5310	House Services
2112	Women's clothing	5311	Domestic Services
2113	Unisex clothing (Adults only)	5312	Coal Merchant
2114	Unisex clothing (Adults and Children)	5313	Plumber
2121	Children's clothing	5314	Electrician
2200	Footwear	5315	Decorator
2201	Shoe Shop (adults only)	5316	Window cleaners
2202	Shoe Shop (all)	5317	DIY Equipment Hire
3000	FURNITURE, FURNISHINGS, DIY SHOPS, HOUSEHOLD APPLIANCES & AUDIO VISUAL PRODUCTS	5320	Car Services
3100	Furniture, Household Appl. and AV products	5321	Garage (car repairs)
3101	Out of Town Furniture Superstore (MFL, Mammoth, Furnitureland, Courts, IKEA)	5322	Exhaust and Tyre Fitters
3102	Other Furniture Store	5331	Filling station (petrol and oil)
3111	Electrical Goods Shop	5341	Car Parks
3112	Audio Visual Shop	5351	Car Hire
3200	DIY Shops and Furnishings	5352	Van Hire
3201	DIY small store	5353	Car and Van Hire
3202	DIY Superstore	5361	Driving School
3203	Hardware Store	5362	Minicab Firm
3204	Carpet Store	5370	Financial Services
3205	Household Textiles Store	5371	Solicitors/ Conveyancing agents
3206	Built-in Kitchen Shop	5372	Banks / Building Societies
		5373	Estate Agents
		5380	Childcare Services

CODE	SHOP/SERVICE DESCRIPTION	CODE	SHOP/SERVICE DESCRIPTION
4000	Department store	5381	Playgroup
4101	Department Store type 1(mainly clothing and footwear + food)	5382	Child Minder
4102	Department Store type 2 (mainly clothing and footwear)	5390	Pet Services
4103	Department Store type 3 (clothing, footwear, furniture , elec. goods + food)	5391	Veterinary
4104	Department Store type 4 (clothing, footwear, furniture & elec. goods)	5392	Kennel
4105	Department Store type 5 (mainly food + others)		
4106	Woolworths		Out of Scope
4200	Miscellaneous Shops	9998	Vacant / Closed
4201	Personal Articles	9999	Outlets not to be sampled as follows:
4202	Jewellery Store		Sainsburys Tescos Argos Index
4211	Knitting wool / Sewing		Victoria Wines Dollond & Aitchison
4221	Chemist / Drug Store		Rumbelows Halfords Comet
4222	Florists		Dixons/Currys
4223	Record Shop		
4224	Photographic Shop		

ANNEX C. Quality management - Continuous programme of improvement and evaluation



ANNEX D. Key attributes of quality

